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APPLIED MATERIALS, INC.  
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EXAMINER

CROWELL, ANNA M

ART UNIT PAPER NUMBER

1763

DATE MAILED: 08/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/918,683

Applicant(s)

SUN ET AL.

Examiner

Michelle Crowell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 34-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-45 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-33, drawn to an electrochemically roughened aluminum or aluminum alloy surface, classified in class 156, subclass 345.1.
  - II. Claims 34-45, drawn to a method of electrochemically roughening an aluminum or aluminum alloy surface, classified in class 204, subclass 640.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process such as by a bead blasting process as discloses in the Background section of the instant specification.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

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4. During a telephone conversation between examiner Thomas Parson and Ms. Shirley Church on October 7, 2002 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-33. Affirmation of this election must be made by applicant in replying to this Office action. Claims 34-45 have been withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### ***Drawings***

5. Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 2, 3, 13, 14, 25, and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2, 3, 13, 14, 25, and 26 recite a surface roughness range, however, the unit of measurement for surface roughness is unclear.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1, 4, 7, 9-12, 15, 18, 20-22, 24, 27, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Satoh (U.S. 6,063,203).

With respect claims 1, 12, and 24, referring to Figure 3 and column 3, line 10 – column 4, line 35, Satoh discloses a semiconductor processing chamber 4 having at least one interior surface 1 (susceptor) comprising electrochemically roughened aluminum or aluminum alloy (col. 3, lines 14-31, col. 3, line 64 –col. 4, line 14).

With respect to claims 4, 15, and 27, the electrochemically roughened aluminum or aluminum alloy surface has the appearance or rolling hills and valleys, when magnified (Figure 2C).

With respect to claims 7, 18, and 30, the electrochemically roughened aluminum or aluminum alloy surface underlies a coating selected from the group consisting of an anodized coating (col.3, lines 16-18).

With respect to claims 9 and 20, the semiconductor chamber is selected from the group consisting of a deposition chamber (col. 4, lines 53-54).

With respect to claims 10 and 21, the limitation of the chamber being an etch chamber and the etching material being selected from the group consisting of a dielectric material, a metal and a polysilicon is considered intended use. A recitation of the intended use of the claimed

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invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. Furthermore, inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims. The apparatus of Satoh is capable of being an etch chamber and etching a material selected from the group consisting of a dielectric material, a metal, and a polysilicon.

With respect claims 11 and 22, the limitation of the process chamber being an etch chamber and fluorine and carbon being used in an etch process are considered intended use. Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim.” The apparatus of Satoh is capable of being an etch chamber and providing fluorine and carbon in an etch process.

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 2, 3, 5, 6, 13, 14, 16, 17, 25, 26, 28, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoh (U.S. 6,063,203).

With respect to claims 2, 13, and 25, the at least one interior surface has a surface roughness ranging from about 1  $\mu\text{m}$  to about 8  $\mu\text{m}$ . Satoh fails to expressly disclose a surface roughness of 100 Ra to about 200 Ra. However, a prima facie case of obviousness still exists because it would have been obvious to one of ordinary skill in the art to optimize the surface roughness of the interior surface during routine experimentation to increase adhesion of materials to the interior surface.

With respect to claims 3, 14, and 26, wherein the surface roughness ranges from about 1  $\mu\text{m}$  to about 8  $\mu\text{m}$ . Satoh fails to expressly disclose a surface roughness of 110 Ra to about 160 Ra. However, a prima facie case of obviousness still exists because it would have been obvious to one of ordinary skill in the art to optimize the surface roughness of the interior surface during routine experimentation to increase adhesion of materials to the interior surface.

With respect to claims 5, 16, and 28, wherein the height of the hills ranges from about 8  $\mu\text{m}$  to about 26  $\mu\text{m}$ . In this case, where the only difference between the prior art (susceptor with hills, Fig. 2C) and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

With respect to claims 6, 17, and 29, wherein the distance between the center of one hill and the center of an adjacent hill ranges from about 30  $\mu\text{m}$  to about 100  $\mu\text{m}$ . In this case, where

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the only difference between the prior art (susceptor with hills, Fig. 2C) and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

13. Claims 8, 19, 23, and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satoh (U.S. 6,063,203) in view of Kugo et al. (U.S. 6,007,673).

The teachings of Satoh have been discussed above.

Satoh fails to teach byproducts being generated during an etch process or a deposition process that adhere to the roughened aluminum surface and the processing component is a wall liner or a gas distribution plate.

Referring to Figures 1 and 9, column 6, line 28-column 7, line 23, and column 13, line 63-column 14, line 45, Kugo teaches a semiconductor processing chamber comprising a plate 10 (col. 6, line 60-col. 7, line 4), a gas distribution plate 30 (col. 14, lines 7-13), and an aluminum wall 1 (col. 14, lines 37-41) which are roughened. By roughening these components, the adhesion of the deposits 21 to the components is enhanced, and therefore production yields are improved. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention that byproducts being generated during an etch process or a deposition process to will adhere to the roughened aluminum surface since adhesion of by products is enhance by the roughening of the surface. Also, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the apparatus of Satoh as to roughening other processing



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components such as the wall liner or the gas distribution plate in order to improve production yields.

***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Banholzer et al. '058, Richardson et al. '454, Sano et al. '887, Hisamoto et al. '304, Fukuta et al. '691, and Shih '767 teach roughened surfaces.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (703) 305-1956. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC *AMC*  
August 8, 2003

*Luz Alejandro Mulero*  
**LUZ ALEJANDRO-MULERO**  
**PRIMARY EXAMINER**